



California HOV/EXPRESS LANE BUSINESS PLAN 2009

Prepared for:



Prepared by:



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Caltrans would like to recognize the following contributors to this Business Plan. An Executive Committee and an Advisory Committee were formed to oversee the development of this HOV/Express Lane Business Plan. Executive directors, policy makers, and technical staff from the following agencies contributed extensively to the development of this document.

- Alameda County Congestion Management Agency
- Bay Area Toll Authority
- Business, Transportation & Housing Agency
- California Highway Patrol
- California Transportation Commission
- Contra Costa Transportation Authority
- Federal Highway Administration
- Los Angeles County Metropolitan Transportation Authority
- Metropolitan Transportation Commission
- Orange County Transportation Authority
- Placer County Transportation Planning Agency
- Riverside County Transportation Commission
- Sacramento Area Council of Governments
- San Bernardino Associated Governments
- San Diego Association of Governments
- San Francisco County Transportation Authority
- San Joaquin Council of Governments
- San Mateo City/County Association of Governments
- Santa Clara Valley Transportation Authority
- Solano Transportation Authority
- Sonoma County Transportation Authority
- Southern California Association of Governments
- Transportation Authority of Marin
- Ventura County Transportation Commission



EXECUTIVE SUMMARY

The California HOV/Express Lane Business Plan is a framework for Caltrans and its partners to focus statewide activity during 2009-2011 that will lead the state to easily implement more flexible and effective system management strategies for High Occupancy Vehicle (HOV) and express lanes (also known as High Occupancy Tolling (HOT) or managed lanes). The ultimate vision is a transportation system offering new commute choices and more reliable travel through congested corridors; where congestion is managed and the availability of an express service option is greatly improved, and where governments at all levels work together to manage demand with effective monitoring and adjustment of operations and design. In this Business Plan, Caltrans, regional transportation agencies, FHWA and the CHP, have developed a coordinated framework to guide the current and future development and operation of HOV and express lanes throughout the state, capitalizing on strong partnerships and operating strategies already in place.

Where We Are Today

Over the last 30 years, a system of HOV lanes has developed as part of the California freeway system; another innovation, express lanes were first added to the system more than 15 years ago. Today over 1,500 miles of HOV lanes, including three express lanes, are either operational or under construction, and over 1,200 additional miles of HOV or express lanes are programmed or proposed.

HOV lanes succeeded in providing an express service incentive for motorists to double-up and carpool, but according to a recent Federal report on their performance, nearly half of the state's HOV lanes are now degraded during peak hours due to high demand. At the same time, other portions of the HOV system are actually underutilized and may require a new operating strategy. The ability of the HOV system to reduce congestion will greatly diminish under current operating approaches if no action is taken.

This Business Plan focuses on those aspects of HOV and express lane development and operations that can and should be addressed at a state level to increase California's ability to manage congestion with HOV and express lanes. Many other very important issues are being addressed and decided appropriately at a local level. The state level challenges being addressed by this Business Plan include:

- Monitoring and managing system performance
- Redefining roles and responsibilities
- Updating policies and guidelines
- Coordinating general public outreach

Where We Want to Be

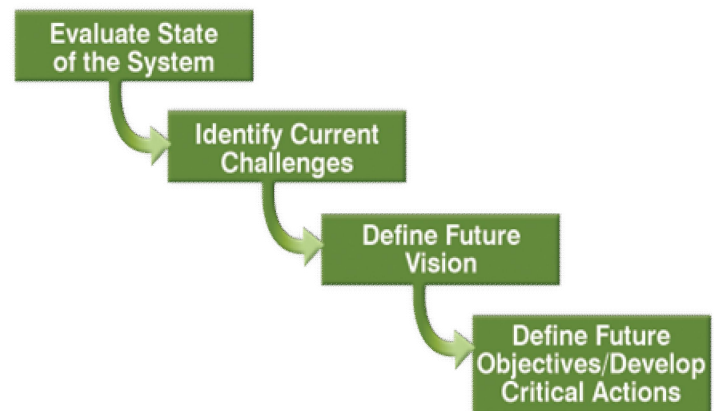
To restore acceptable service levels, the State of California is embarking on an evolutionary approach to enhancing the HOV and express lanes system. Part of the state's plan is to provide transportation agencies the direction and flexibility needed to aggressively initiate innovative congestion management strategies. These strategies would include the ability to make careful yet bold decisions of design geometry, access, striping, signing, hours of operation, minimum occupancy requirements, toll technologies and strategies, implementation phasing, partnership roles, and more. A consensus vision for the future of express lanes in California is defined in the Business Plan. That future system would:

- Offer new and reliable mobility choices.
- Provide, for the driver's benefit, consistent facilities with coordinated, recognizable design and a seamlessly connected network.
- Conform, where possible, to established policies, standards, and guidelines, while making changes to enable innovative project development and management as needs, methods, and technologies evolve.
- Measure performance using consistent statewide procedures for research, data collection and performance reporting, enabling decision making and allowing the HOV/express lane system to be managed and operated efficiently.
- Encompass the views of stakeholders working together under a renewed commitment to partnership that includes coordination, communication and mutual support.

How Do We Get There?

A group of stakeholders comprised of executive directors, policy makers, technical staff, and operational managers from regional transportation agencies, California Highway Patrol (CHP), Federal Highway Administration (FHWA), and Caltrans, convened and developed this Business Plan as an initial step toward a new generation of HOV and express lanes. To achieve the vision, the plan outlines four primary areas of focus:

- How to enhance system performance.
- How to increase communication and collaboration among partners.
- How to facilitate effective implementation of the system.
- How to increase public acceptance.





The critical actions to achieve the Business Plan vision are designed to provide a statewide perspective in supporting regional solutions. The actions are not comprehensive and only represent those that need to happen at the statewide level. Local actions, successes, and leadership continue to be encouraged.



The Immediate Focus

California has already hit the ground running with several ongoing initiatives that are addressed within the list of identified critical actions to support the implementation of this Business Plan. Caltrans is committed to working with local partners to identify the resources needed and the best means of maintaining focus on these critical actions. Partners should continue to make progress and build upon these substantial efforts and consider the topics addressed in this Business Plan in doing so. Other critical actions are slated to be addressed immediately. The top priorities moving forward include:

- A4: Utilize better tools to collect, aggregate, and report corridor-wide data.
- A5: Assess active HOV lane management via pilot project(s) and ongoing monitoring.
- B1: Develop an ongoing coordinating committee and apply needed resources for HOV/express lane decisions and actions.
- C1: Update Caltrans' *High-Occupancy Vehicle Guidelines*.
- C4: Revise or replace Title 21.
- D1: Educate the public on the benefits of HOV and express lanes in a common way.

A Statewide Plan for Action 2009-2011

A commitment on the part of the partners to carry out these actions will bring California closer to its goal of delivering the next generation of HOV and express lanes. Each of the following actions in the table below is defined in more detail in the full Business Plan report.

Focus Areas and Critical Actions		Caltrans	CHP	FHWA	Regional Agencies	Ongoing	Ready to Start	Start Near-term
Focus A: Critical Actions to Enhance System Performance								
A1	Collect and report consistent data.	★			☞		⊙	
A2	Establish common performance benchmarks and measures.	★			☞			⊙
A3	Improve data collection support and resources.	★			☞		⊙	
A4	Utilize better tools to collect, aggregate, and report corridor-wide data.	★				⊙		
A5	Assess active HOV lane management via pilot project(s) and ongoing monitoring.	☞			★	⊙		
A6	Establish regional and state guidelines for implementation of dynamic operations and clarify these guidelines with FHWA.	★			☞			⊙
A7	Expand the discussion of HOV/express lane strategies with transit interests.	☞			★			⊙
A8	Expand the assessment of the impacts of HOV/express lanes on goods movement and vice versa.	★			☞			⊙
Focus B: Critical Actions to Increase Communication and Collaboration Among Partners								
B1	Develop an ongoing coordinating committee and apply needed resources for HOV/express lane decisions and actions.	★	☞	☞	☞	⊙		
B2	Establish staff resources and reserve for enforcement.		★		☞			⊙
B3	Address roles and responsibilities for violation enforcement.	☞	★		☞			⊙
B4	Share lessons learned on financing options and operations and maintenance cost expectations.	☞	☞	☞	★	⊙		
Focus C: Critical Actions to Facilitate Effective Implementation								
C1	Update Caltrans' <i>High-Occupancy Vehicle Guidelines</i> .	★	☞	☞	☞		⊙	
C2	Support enabling legislation for more widespread tolling authority.	☞			★	⊙		
C3	A statewide policy for exempt or discount vehicles should be considered.	★		☞	☞			⊙
C4	Revise or replace Title 21.	★		☞	☞		⊙	
C5	Research automated enforcement technology and implement as available.	☞	☞	☞	★	⊙		
Focus D: Critical Actions to Increase Public Acceptance								
D1	Educate the public on benefits of HOV and express lanes in a common way.	★	☞	☞	★	⊙		
D2	Provide supporting data/education that addresses the negative connotations and perceptions.	★	☞	☞	★			⊙
D3	Provide a common symbol for use in recognizing the express lanes.	★		☞	☞		⊙	

★ Lead Agency ☞ Support Agency ⊙ Target Timeline



The Key to Success is Working Together

In the joint conduct of these Critical Actions, the following principles apply:

- All stakeholders commit to apply resources and work together to find a balance of responsible solutions.
- Regional partners retain the ability to make financial decisions, including tolling authority.
- The state maintains stewardship of safety, mobility, and resources while committing to partner in supporting regional solutions.
- Partners commit to developing regional systems with common standards such that variations are not confusing to motorists.
- Corridor wide analysis and planning is encouraged to maintain a “system” solution for travelers.
- Partnerships are encouraged to integrate transit, goods movement, and environmental concerns.



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1. INTRODUCTION

This document presents the California HOV/Express Lane Business Plan prepared by Kimley-Horn and Associates, Inc. for the California Department of Transportation (Caltrans). It was developed in a participatory fashion with Caltrans staff in conjunction with an Advisory Committee constituted of individual stakeholders representing Caltrans, regional transportation agencies, the California Highway Patrol (CHP), and the Federal Highway Administration (FHWA). This Business Plan represents the culmination of the review and analysis of key issues that are appropriate to address at the state level to enable a more uniform approach for HOV and express lane design and operations.

The purpose of this California HOV/Express Lane Business Plan is to provide a framework to guide the future development and operation of this portion of the transportation network into a coordinated, connected and commonly recognizable system for California. This framework will inform business decisions regarding design, operations, and policies that govern these facilities as determined in partnership by Caltrans and regional transportation agencies across the state. This Business Plan also provides a context for improved communication and partnerships between Caltrans and the partner agencies as the HOV/express lane system is expanded. This Business Plan will lead to implementation of more complex management techniques to further enhance system performance into the future.

This section summarizes background, terminology, the development process, stakeholder participation, and contents of subsequent sections.

1.1 Background

A system of High Occupancy Vehicle (HOV) lanes has been developing as part of the California freeway system for more than 30 years. Currently, there are over 1,500 miles of HOV lanes operating or under construction, and over 1,200 additional miles are programmed or proposed¹. Improving technologies and changes in funding formulations added express lanes (lanes that combine preferential access for high occupancy vehicles with tolling) over 10 years ago. While two facilities currently operate as express lanes and one more is under construction, many more are planned to become operational in the coming years.

The original objective of building HOV lanes was to provide an express service incentive for motorists to carpool, thereby reducing congestion. While this has been a highly successful program, many of these lanes have since degraded with nearly half of all HOV lanes across the state experiencing congestion during the peak hour². It follows that more than half of these lanes operate satisfactorily during the peak hour and most likely operate satisfactorily during non-peak hour times, and it is recognized that HOV lane performance varies by area and facility. To restore the service levels, partners need more flexibility to make operational changes such as changing minimum occupancy requirements, adding capacity, modifying access provisions, or charging tolls.

Population and economic growth are expected to continue to result in increasing demand on the state highway infrastructure. A nationwide trend for addressing congestion is to use more congestion-based pricing/tolling on express lanes. Congestion pricing supports the shift from funding based on sales taxes on gas to direct use-based fees and provides a greater ability to

¹ Caltrans, Division of Traffic Operations. (2008, July). *Statewide HOV Lane Inventory Report* (unpublished).

² Caltrans, Division of Traffic Operations. (2007). *SAFETEA-LU Federal Determination Report: ILEV/Hybrids on HOV Facilities in California*.



control the level of service and travel time reliability. Express lanes provide a managed approach to improving system performance and reliability, optimizing use of capacity, and creating new sources of revenue to further improve transportation in the corridor, including transit.

California has long been a leader in express lane service, having successfully operated two of the first such facilities in the nation for over a decade. Both the 91 Express Lanes in Orange County and I-15 Express Lanes in San Diego County have been viewed as models for expansion of this management strategy across the state. They have demonstrated benefits such as strong partnerships among public and private entities, improved operations, balance between revenue generation and corridor performance (person throughput has been emphasized over cash flow), reintroduction of revenues to the corridors and to transit in the corridors, and an overall positive public opinion of the service being provided. This Business Plan seeks to capitalize on these successes, encourage continued regional decision-making authority, and offer a new level of coordination across the state especially to address future connectivity of the express lane system.

Caltrans has traditionally been the owner, builder, operator, and maintainer of the highway system. For many years, regional transportation agencies have been assuming a stronger role in planning, design, construction, and operations of highway projects and express lanes through the use of different financing strategies such as sales tax measures, public-public partnerships, and public-private partnerships, among others. This change in role represents a significant shift in responsibilities for Caltrans and for the partner agencies involved, causing the need to reexamine the relationships between Caltrans and the regional transportation agencies.

1.2 Terminology

Managed lanes is a term used to describe travel lanes that are under lane controls (such as the use of message signs that allow or disallow travel on a lane by displaying a green arrow or a red 'X'), variable speed limit controls, user restrictions (carpools, trucks, or transit vehicles), tolling, and others. The usage of the term *express lane* varies nationally. Caltrans and this document utilize the term *express lanes* synonymously with *High Occupancy Tolling (HOT)* lanes, where preferential access is provided for high occupancy vehicles or toll payment. *HOV lanes*, often referred to as carpool lanes, are a type of managed lane that limit access to vehicles with higher occupancy (currently these lanes vary between 2+ and 3+) and current law allows for access by certain "green" vehicles. Both *express lanes* and *HOV lanes* are considered types of *managed lanes*. The terminology used in this Business Plan, and commonly used in the industry, is depicted in **Figure 1**. This Business Plan covers only HOV and express lanes – those highlighted in orange. Additionally, the term *corridor*, as used in this Business Plan, is intended to mean a segment of highway that includes all highway lanes and any parallel arterials.

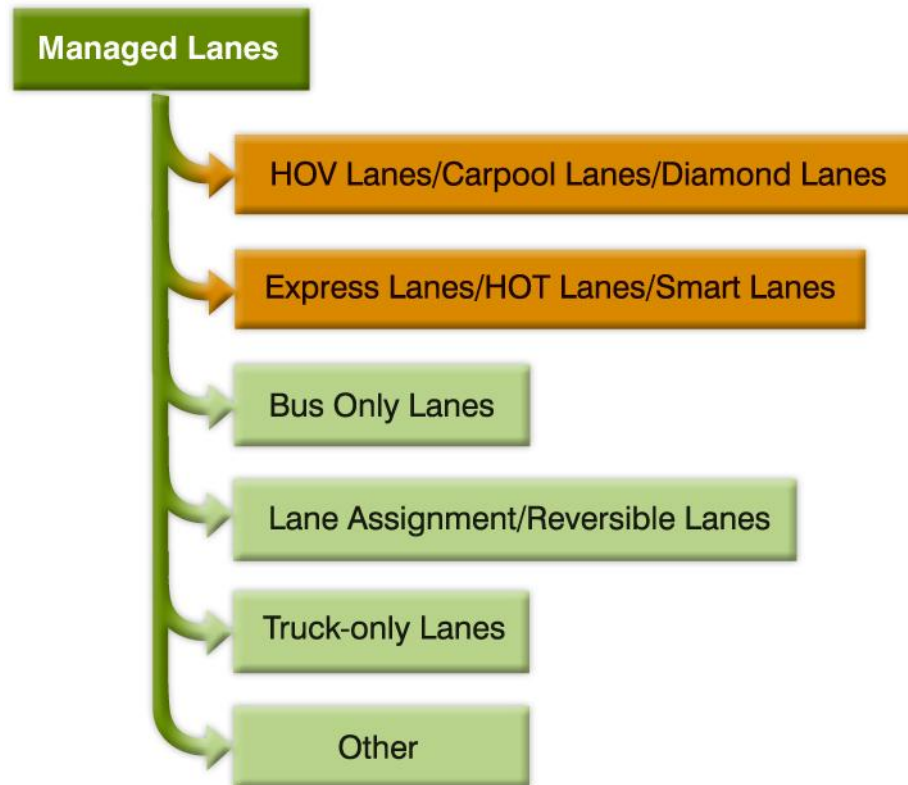


Figure 1 – Business Plan Terminology

1.3 Business Plan Development Process

As shown in **Figure 2**, this Business Plan was developed through a multi-step process that started with an assessment of the current system and how it is operated and used by motorists. The results of the system assessment were supplemented by discussions with stakeholders that revealed issues and challenges related to HOV and express lane implementation. A vision was created to lay the foundation for how the system of express lanes will look and operate in the future. Objectives were then developed to guide the definition of specific critical actions needed to address the challenges and achieve the vision.

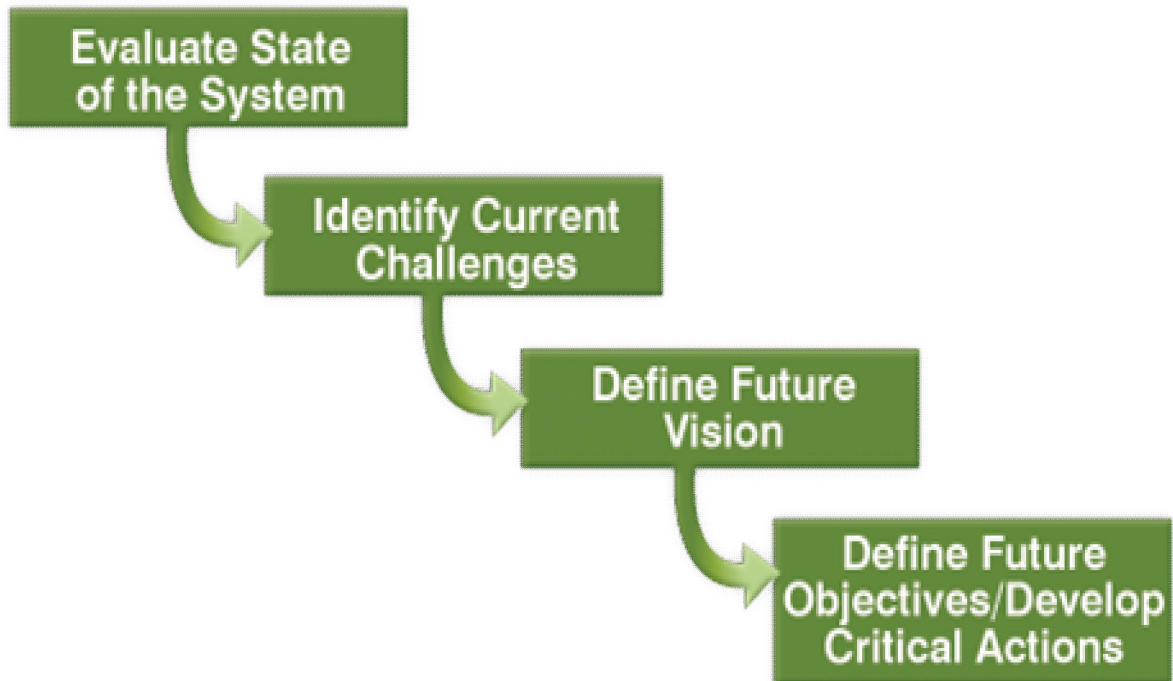


Figure 2 – Business Plan Development Process

1.4 Stakeholder Participation

An Executive Committee was formed to oversee the development of this California HOV/Express Lane Business Plan. It was comprised of executive directors and policy makers from a stakeholder group of public agencies consisting of FHWA, regional transportation agencies, CHP, and Caltrans. Each member of the Executive Committee was asked to delegate representatives to serve on an Advisory Committee to discuss technical issues related to development of this Business Plan.

1.5 Report Contents

The remainder of this report is organized as follows.

Section 2 provides an overview and assessment of the current system.

Section 3 discusses existing challenges in achieving the vision.

Section 4 summarizes the ultimate vision for the HOV/express lane system. The vision statement establishes a focused direction for the effective development and operation of the HOV/express lane system.

Section 5 identifies four objectives that were derived from the visioning process and from the challenges, and a specific set of actions to achieve the objectives. A schedule for implementation of recommended actions and related projects is also presented.

2. STATE OF THE SYSTEM



This section summarizes a review of the current HOV/express lane system, which provided insight into what changes are needed in policy, management, and design to maximize the benefits from these investments.

2.1 Existing, Planned, and Proposed HOV and Express Lanes

As of July 2008, the existing HOV lane system had 1,424 existing lane-miles and 124 lane-miles under construction. Future expansion of the network includes 269 programmed lane-miles and 974 proposed lane-miles planned by state and local agencies³.

There are currently two express lane facilities in the state: the 91 Express Lanes in Orange County and the I-15 Express Lanes in San Diego County. There are express lane projects with legislative authority that are under study or development by these agencies: Los Angeles County Metropolitan Transportation Authority, Riverside County Transportation Commission, San Diego Association of Governments, Alameda County Congestion Management Agency, Santa Clara Valley Transportation Authority, and the Sunol Smart Carpool Lane Joint Powers Authority.

Figures 3 through 5 show the location of existing and planned HOV and express lanes in the state. The information regarding planned facilities reflects the information reported by Caltrans Division of Traffic Operations, High-Occupancy Vehicle Systems Branch as of July 2008. Currently, HOV lanes are located in the Sacramento area (District 3), San Francisco Bay Area (District 4), and southern California (District 7, 8, 11, and 12). Future HOV lanes are planned in each district. The 91 Express Lanes in Orange County and the I-15 Express Lanes in San Diego County are shown as well. Toll roads, such as the SR 73, SR 133, SR 241, and SR 261 in Orange County are not a part of this report.

2.2 HOV and Express Lane Operations

The operating approaches for HOV lanes vary by district and in some cases by facility, in terms of occupancy requirements, hours of operation, and type of access. Implementing changes in HOV lane operations from the statewide perspective involves the consideration of many issues relating to engineering, regulation, consistency, performance, and possibly legislation.

The two express lane facilities (91 Express Lanes and I-15 Express Lanes) also have fundamental differences with respect to hours of operation, occupancy requirements, tolling requirements, overall design and type of access.

³ Caltrans, 2008

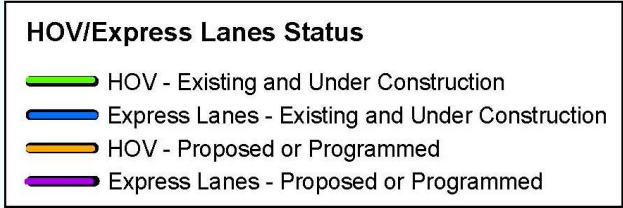


Figure 3 – Existing and Planned HOV/Express Lanes in Southern California

Source: Caltrans Division of Traffic Operations, July 2008



Figure 4 – Existing and Planned HOV/Express Lanes in the Bay Area

Source: Caltrans Division of Traffic Operations, July 2008



Figure 5 – Existing and Planned HOV/Express Lanes in the Sacramento Area

Source: Caltrans Division of Traffic Operations, July 2008

2.3 HOV Performance Assessment

The HOV lane performance data compiled as a part of this Business Plan included peak-hour volume, occupancy rates, and violation rates. The following reports were reviewed as basis for the performance assessment:

- Caltrans District 3, Office of Freeway Operations. (2007). *High Occupancy Vehicle Lanes Status Report*. Sacramento, CA: District 3.
- Caltrans District 4, Office of Freeway Operations. (2007). *2007 Bay Area HOV Lanes*. Oakland, CA: District 4.
- Caltrans District 7, Office of Freeway Operations, HOV Operations Branch. (2007). *2007 HOV Annual Report*. Los Angeles and Ventura County: District 7.
- Caltrans District 8, Traffic Operations. (2008). HOV Traffic Counts (unpublished). Riverside and San Bernardino County: District 8.
- Caltrans District 11, Traffic Operations and Engineering Support Branch. (2007). *Annual Summary of HOV Lane Operations – 2007*. San Diego, CA: District 11.
- Caltrans District 12, Operational Systems Branch. (2007). *2007 Annual HOV Report*. Orange County: District 12.

Annual performance monitoring of HOV lanes is led by each Caltrans district office. County congestion management agencies augment such monitoring as part of routine status reporting. These independent efforts often lack consistency with respect to data collection and reporting. The performance monitoring of express lanes is the responsibility of the regional transportation agencies that own and operate the facilities and generally involves little or no coordination with Caltrans for data collection and analysis. Express lane performance monitoring is generally more comprehensive than for HOV performance monitoring, requiring additional measures such as pricing distribution and revenue generation.

The data used for the annual report analyses of HOV performance are typically collected manually at a very limited number of points along each corridor and are not necessarily representative of the performance of the entire corridor. Even with this limited data, the following observations are possible.

- According to a report by Caltrans, nearly 50% of the HOV lanes in the state experience periods of degradation in the peak hour according to the federal definition – meaning that average speeds of 45 mph speed or lower have been measured more than 10% of the time⁴.
- Violations of the occupancy requirement are spot statistics that require either technology or staff time to collect, neither of which is readily available.

⁴ According to the *Federal-Aid Highway Program Guidance on High Occupancy Vehicle (HOV) Lanes, Chapter IV Implementation Site* (August 2008), degradation was defined as the following: “The minimum average operating speed is defined at Section 166(d)(2)(A) as 45 miles per hour (mph), for an HOV facility with a speed limit of 50 mph or greater, and not more than 10 mph below the speed limit for a facility with a speed limit of less than 50 mph. Section 166(d)(2)(B) provides that an HOV facility is considered degraded if it fails to maintain a minimum average operating speed 90 percent of the time over a consecutive 180-day period during morning or evening weekday peak hour periods (or both for a reversible facility)”.

- The monitoring currently focuses on the HOV/express lane only. The shift to better informed operational decisions on HOV/express lanes requires the assessment to include the full corridor, meaning all lanes of the highway plus alternate/parallel arterials.

Figure 4 is a map showing the location of the degraded HOV segments during the A.M. and P.M. peak hour periods in northern California. **Figure 5** depicts the same information in southern California. Degradation is shown using both the federal definition of degradation and the Caltrans level of service (LOS) definition⁵. Comparing the different methods for evaluating congestion, the maps show a greater quantity of degraded segments using the federal definition.

⁵ A threshold of LOS “C” is set at a density of 26 passenger cars per mile per lane (pc/mi/ln). An HOV lane is considered to be experiencing break-down conditions at LOS “D”, where the density exceeds 26 pc/mi/ln.

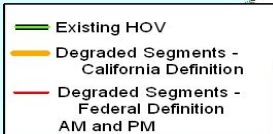


Figure 6 – Peak Hour HOV Facility Degradation in Northern California

Source: Caltrans, *SAFETEA-LU Federal Determination Report: ILEV/Hybrids on HOV Facilities in California*, 2007, p.14



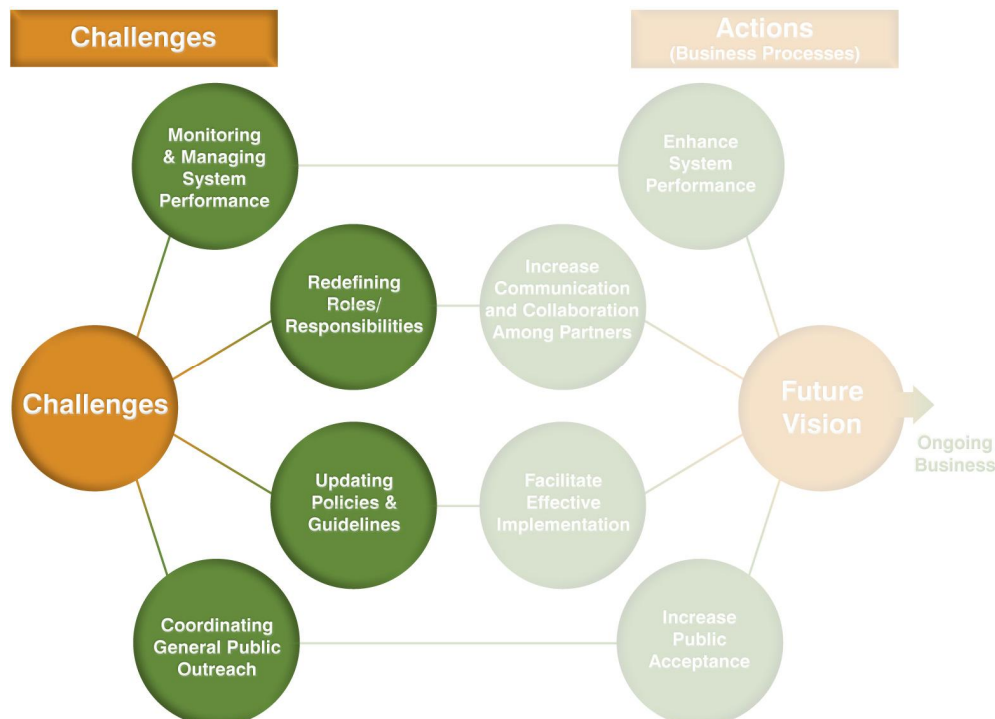
Figure 7 – Peak Hour HOV Facility Degradation in Southern California

Source: Caltrans, *SAFETEA-LU Federal Determination Report: ILEV/Hybrids on HOV Facilities in California*, 2007, p.15

3. CURRENT SYSTEM CHALLENGES



While many portions of the HOV system are currently operating well, some portions are no longer providing express service for motorists due to changes in demand, funding, and other factors. Because of the resultant reduction in travel times and reliability, the HOV system may no longer be encouraging a significant shift from single-occupant vehicles to high-occupancy vehicles. Conversely, on other portions of the HOV system, the lanes may be underutilized during portions of the day. These realities require implementing system management strategies in the form of increasing occupancy, adding lane capacity, modifying operation times or access openings, or introducing express lanes that provide enhanced service via payment of congestion-based fees. Regional transportation agencies and Caltrans do not currently have the flexibility to make the changes that are needed to aggressively and reliably improve the remaining HOV lane system. In order to solve this problem, technical and institutional changes are needed and lessons learned from pilot projects need to be shared to support more fully managing the system. This section defines challenges that are currently being experienced in California that have the potential to be solved at a state level. The following figure depicts the overall flow of this Business Plan's contents: the challenges on the left lead to definition of critical actions that when carried out will lead California closer to the envisioned system in the future.



Challenges are categorized into four primary areas:

- **Monitoring and Managing System Performance** – Research needs to be increased and improved to fully understand the performance of HOV lanes and the effects on the corridor of

making operational changes. It is important to consider all freeway lanes *and* the parallel arterials where applicable. More and better data is needed to do this. While some regions in the state already have introduced different operating parameters for HOV lanes based on the congestion being experienced, other regions face challenges in enacting operational changes. A comprehensive understanding of the dynamics of corridor-wide operations does not exist. Pilot projects and robust monitoring and data collection are needed to establish this knowledge base.

- ***Redefining Roles and Responsibilities*** – Roles and responsibilities of all partner agencies are changing as regional transportation agencies have taken on more prominent roles in the operations of highway facilities and are doing so on a more common basis across the state. Processes such as planning, implementation, operation, management, performance monitoring, and liability are no longer as clear-cut as they were in the past when Caltrans was the sole owner, operator, and maintainer of the highway system. New issues arising from the express lane concept such as revenue reinvestment, cost sharing, and tolling operations have yet to be fully vetted under these new roles. FHWA's oversight and involvement is not clearly communicated in all cases and associated guidelines for obtaining FHWA approval on physical and operational changes in the field are not always clear and are sometimes inconsistent. Gaining legislative authority for tolling is challenging and time consuming while financing options and associated costs are not clearly understood.
- ***Updating Policies and Guidelines*** – As the HOV/express lane system evolves to provide better service, changes to policies and associated technical guidelines are needed. Specific attributes of the project development process such as communication standards and physical design standards stem from policy decisions made by regional and state transportation agencies. The following points highlight specific issues.
 - Reducing congestion in the express lanes may require increasing occupancy from 2+ to 3+ in many corridors. Districts and/or regional transportation agencies do not all have the political support to change minimum occupancy requirements on existing HOV or express lane facilities. Therefore, a distinct change is needed to support these operational decisions on a consistent and widespread basis across the state. These decisions have corridor, regional, statewide and perhaps national implications regarding consistency in practice looking forward.
 - The current HOV Design Guidelines need to be augmented and revised to include express lane facilities, including implications of dual express lanes as the optimum way to mitigate the performance impacts of a single vehicle (traveling slow or stopped) or merging/weaving movements causing lane congestion and to support a viable business model. Design decisions should be considered early in the development process with a full assessment of alternatives that comply with standards as well as variations that may require design exceptions.
 - The current statewide communication standard for toll tags, commonly known as Title 21, has served the state well in the past, but does not meet the current or future needs of express lane facilities or expanded congestion pricing techniques⁶. At a minimum the

⁶ California Code of Regulations, Title 21, Division 2, Chapter 16. Compatibility Specifications for Automatic Vehicle Identification Equipment.

standard needs to expand to provide for two-way messaging between the roadside equipment and the transponders in vehicles.

- **Coordinating General Public Outreach** – Challenges encountered in obtaining approvals and authorities for express lanes have typically been associated with a lack of acceptance from the public. As dozens of express lanes roll out in the coming years, public perception will compound and it will become even more important to build on lessons learned from successful express lane deployments in California and across the nation and be consistent in the way that multiple agencies communicate with the public.

3.1 Monitoring and Managing System Performance

Historically, not enough baseline data or research results are available, either in quantity, quality, or consistency across facilities, regions and districts for the complete HOV system performance to be studied in depth. Regional transportation agencies are more active in collecting extensive data on the express lane facilities that are in place now. The overall system's performance, in terms of detailed dynamics, problems and potential solutions, is not fully understood in a consistent manner across the state on all facilities. More information is needed for improvements and operations to be planned and implemented on a more proactive basis. As a result of this lack of specific analysis, the public support needed for agencies to enact significant changes in operational policies is sometimes lacking, thus further hindering progress.



The following paragraphs outline specific challenges related to system performance monitoring and management.

- **Statewide performance measures and benchmarks are needed.** HOV and express lane performance measures and benchmarks are not defined at a state level. The lack of defined standards of performance hinders an accurate statewide assessment of system operations.
- **Current data collection practices need to be improved.** Budget constraints (both in terms of limited funding and timely access to funds) reduce staff availability to collect data and the frequency of data collection. The majority of Caltrans HOV lane system data collection is currently collected manually at spot locations biennially and reported by each district on an annual basis when budgets allow. Some data is collected by regional transportation agencies, however it is not compiled with the Caltrans data. Automatically collected data, housed in the

California Freeway Performance Measurement System (PeMS)⁷ is not optimally utilized in the annual reporting and analysis.

- ***PeMS does not currently contain the tools to analyze full corridor-wide and lane-specific performance in a consistent manner.*** PeMS is currently designed to provide aggregated data in part due to the currently defined reporting parameters and in part due to the availability and reliability of data being utilized for reporting. Performance measurement of individual HOV lanes, express lanes, and full corridors, including all lanes of the highway and parallel arterials, is ultimately desired. Caltrans is currently enhancing PeMS to add functions to enable monitoring of different lane types and different aggregations and summaries of resulting data. It is desired to monitor the complete corridor (all lanes plus parallel arterials) consistently across the state in order to determine and support assertive measures to improve the system.
- ***Performance measures and impacts for changing operational parameters of HOV lanes such as minimum occupancy and operating hours are not widely understood.*** A comprehensive, in-depth understanding of the dynamics of corridor-wide operations based on clear, discrete performance measures is necessary to evaluate the impacts of potential operational changes. This includes the cause and effect of bottlenecks, system reliability, and the impacts of operational changes such as allowances for different vehicle types, access markings, minimum occupancies, use charges, and others. Additional data is needed to make these determinations. Robust performance assessment and monitoring are needed to determine and support bold operational changes.
- ***State and federal guidance on changing operational parameters of HOV facilities has not been consistent.*** Guidelines for changing operational parameters such as minimum occupancy requirements or hours of operation need to be clearly written and communicated at both state and federal levels. The inconsistent guidance has in some cases caused delays in changing hours of operation, striping or other operational parameters on existing HOV lane facilities. There is concern that this may hamper the ability of other agencies to proactively manage facility performance by delaying approval to change similar parameters on their facilities. Guidelines to gain approval to change operational parameters need to be clarified with FHWA.
- ***The impacts of HOV/express lanes on alternative modes and programs is not consistently examined or considered across the state.*** Alternative modes and programs (transit, park-and-ride, transportation demand management strategies, corridor management, etc.) are being included in the HOV/express lane discussion on a district-by-district basis. Many regional plans consider the region-wide interaction of transportation modes. Corridor System Management Plans (CSMP) and Integrated Corridor Mobility (ICM) programs are underway that are addressing system-wide and multi-modal performance and potential improvements. The opportunities to coordinate HOV/express lane operations with transit and goods movement and vice versa are not currently clear across the state.

⁷ PeMS is a program that was developed jointly by the University of California at Berkeley and the California Department of Transportation. It is a publically available online system (<https://pems.eecs.berkeley.edu/>) that has been developed and enhanced over the course of many years to collect historical and real-time freeway data from the various freeway management systems in Caltrans for freeway performance measurement calculations.

3.2 Redefining Roles and Responsibilities

Caltrans is defined by law as the owner, builder, operator, and maintainer of the state highway system. Regional transportation agencies are now taking a strong role in planning, design, and construction of highway improvement projects, and day-to-day operations and decision making within that role—funded through sales tax revenues, toll revenues, or other sources. In this new paradigm, Caltrans remains a key figure, retaining ownership, and hence, liability, as well as maintenance responsibilities. Caltrans, as a state organization, also holds the ultimate role and responsibility of ensuring that the system is built and operated statewide in a manner that allows connections of the separately developed segments in the future. The experiences of the many effective partnerships that exist now need to be shared across the state to implement aggressive system enhancements.

Specifically, several challenges regarding roles and responsibilities among partners are summarized below.



- ***Structure, roles, and responsibilities between Caltrans and partner agencies have shifted and as such are not clearly defined in all cases.*** On occasion, there is a lack of clear decision-making authority on issues regarding planning, design, project delivery, construction, financing, operations, maintenance, enforcement, revenue/cost sharing, and liability. Regional transportation agencies may have different priorities, policies and business philosophies from state agencies. Improved communication and clear delineation of leadership in each area are needed to facilitate the development and roll-out of new HOV and express lane facilities.
- ***Enforcement of express lanes under current practices should be performed by two parties and their roles are not clearly distinguished.*** There are different types of violations to be enforced: toll, access, safety and occupancy. The regional transportation agencies are generally responsible for enforcing toll violations, and the CHP is generally responsible for occupancy, access, and safety enforcement. The CHP is compensated for its enforcement efforts on the express lanes through reimbursable services agreements with the regional transportation agencies. It is understood that the CHP at times gets involved in toll enforcement in express lanes, which is not considered to be among the primary objectives of CHP (which are: prevent loss of life, injuries, and property damage; maximize service to the public and assistance to allied agencies; manage traffic and emergency incidents; protect the general public and state assets). In addition, the basic challenge of role clarity is complicated by the concern that ample resources may not be available for full enforcement as the HOV/express lane system expands.

- **Financing options through public-private partnerships should be enabled in California without jeopardizing service enhancements on adjacent roadways.** Private partnerships have enabled new facilities to be built such as the 91 Express Lanes. Non-compete clauses (contract clauses in lease agreements between private investors and public-sector owners that disallow improvements to be made within the corridor or adjacent/alternate routes for a given period of time) have been problematic in the past and have resulted in reduced performance on the general purpose lanes. Private involvement is desired, but not to the detriment of the rest of the system. A careful balance, through planning, agreements and ongoing monitoring, will be needed to attract and enable private investment while protecting the overall transportation system.
- **Operations and maintenance costs are not clearly understood across the state.** The costs associated with operating express lanes and maintaining these “facilities within facilities” and the technologies that enable their effective operation are much different than traditional pavement maintenance costs and need to be better understood and budgeted for across the state as new express lanes are being planned. The ability to anticipate operations and maintenance and other lifecycle costs can be built upon the experiences of the regional transportation agencies that have been operating express lanes successfully in California and across the nation.

3.3 Updating Policies and Guidelines

Currently, HOV and express lanes are being developed in a patchwork fashion in California. Though regional transportation agencies are involving partners outside of their regions in the process to design and facilities in their own regions, the decisions are still segmented due to the inherent fact that there are multiple agencies, differing landscapes, and differing priorities. There is a need to document lessons learned and improve the relevant guiding documents in order to simplify the design process for project development teams and to ultimately develop the HOV/express lane system in a way that is as consistent as possible to users. Users may not encounter the same exact design or pricing approach on two express lane facilities, but it is desired that they be similar enough to allow travelers to recognize the two facilities as being a part of the same system. Travelers need to know what to expect in terms of differences so the HOV/express lane system is desirable and well-used rather than confusing and thus avoided. The system needs to have elements of interoperability, connectivity, and sameness that facilitate its use. Improvements are needed in the following areas.



- **An update to the High-Occupancy Vehicle Guidelines** (Caltrans, 2003) is needed immediately. The 2003 Edition of this Caltrans document provides ample advisory guidelines

for HOV lane implementation and should be expanded to include express lane guidance. It needs to incorporate lessons learned on recently completed or ongoing HOV and express lane projects and research results. Modifications to the guidelines and any relevant design policies should include updated guidance on standard options for striping, access opening locations, enforcement areas, dual-lane possibilities, conversion (HOV to express lane) strategies, hours of operation, and occupancy requirements.

- ***Gaining legislative tolling authority is challenging and not efficient to the express lane process.*** The current process of gaining legislative authority on a facility-by-facility basis is not efficient and is the cause of significant time spent in the process of deploying express lanes. Blanket tolling authority at a statewide level does not currently exist.
- ***Pricing and qualifying requirements for express lanes may vary across the state.*** These parameters for new facilities are being developed by each regional transportation agency individually (while partners are conferring regularly, operational decisions are not made on a consensus-basis). It is critical that regional transportation agencies retain this authority to make ultimate pricing and qualifying decisions in order to maintain the viability of the express lane facilities, especially where toll revenue bonds are being sold to finance the projects. Express lanes that are funded with bond revenues require a financially viable operation that is treated as a business throughout the life of the bond repayment period (e.g., 30 years) or franchise period (e.g., 50 years.) Yet, ensuring that drivers can move across county boundaries in the future and have a reliable expectation of how much it will cost, the qualifying requirements for express lane status, and the hours of operation, are seen as important parts of the ‘standardization’ and connectivity of the system as it expands in the near- and long-term future.
- ***Research is required regarding automated violation enforcement technologies for HOV/express lanes (addressing, for example, occupancy, vehicle type if exempt, and toll evasion).*** Technology needs to be researched, adopted and implemented to allow for automated enforcement.
- ***Title 21 is outdated and does not provide sufficient flexibility to accommodate express lane and other tolling operations.*** Having a single transponder and single payment account that will work for different express lanes is crucial, especially as the system expands and becomes more connected. A more robust standard is needed that allows for two-way communications with the transponders. The current standard, Title 21, does not support expansion to cordon pricing, parking, and other areas that are being deployed and/or considered that will benefit from interoperability with the express lane system. National standards and guidance may also need to be taken into account to address interoperability outside California with neighboring states.



3.4 Coordinating Public Outreach

There are significant political and social pressures that surround the development of or changes to HOV and express lanes. There is a prevalent public perception among many that the highway system has already been paid for by gas and income taxes. Drivers have a comfort level with the status quo, and a familiarity with free access to the highway system. There is a concern that express lanes exclude disadvantaged, low income motorists, thus creating an inequity. What has not been well communicated in a broad way across the state or the nation is the concept and benefit of a shift toward funding based on direct use-based fees rather than sales taxes on gas. Careful communication with decision makers and their constituents of the benefits of these new approaches may assist agencies in more effectively navigating this challenge to gain the approvals needed to implement express lanes or change HOV lane operations to improve performance. The following summarizes the challenges related to public outreach.



- **Public approval for express lanes and congestion pricing in general is not widespread.** Express lane benefits have been communicated persuasively to the general public in specific target markets related to the 91 Express Lanes and I-15 Express Lanes as well as several other efforts that are currently in the planning, design or implementation phases. These successes should be capitalized on to provide the basis for a common voice for communicating with the general public across the state. Based on a media sample taken as a part of the research efforts for this Business Plan, it appears that it is not clear to the general public how express lanes benefit the entire corridor and not just the express lane or tolled customers. The concepts of maximizing capacity through congestion pricing have not been widely understood, nor have the other goals often associated with congestion pricing, such as increasing transit and rideshare modal share and toll strategies to encourage time shifting when express lanes are more likely to have extra capacity.
- **Express lanes are perceived negatively as socially inequitable especially when HOV lanes are changed to express lanes.** There is an impression by the general public, as experienced by regional transportation agencies that have been planning and designing express lanes within existing capacity, that express lanes reinforce social inequities for users. Express lanes are perceived as “Lexus lanes” that are only affordable to motorists with high incomes. While some user surveys have shown that this impression improves and trust increases after implementation, there is a lingering concern by officials and the public that could be proactively addressed as more express lanes are implemented. Successes in prior implementations and the projected real benefits need to be easily available and understood by the general public, the media, and decision making officials. A total of five facilities (SR

237/I-880 connector, I-580 and I-680 in northern California and I-10 and I-110 in southern California) are currently converting existing HOV lanes into express lanes. It is important to address perception and engage in public communication (including surveys) consistently and on a large scale in order to enable future development of express lanes in California.

- ***Signing is not uniform statewide.*** Outreach is not currently conducted in a coordinated manner across the state, but in select areas, there are successes that can be capitalized upon. There is not a commonly recognizable symbol that provides a connection among express lanes as being related or otherwise as operating under similar strategies and guidelines. FasTrak® has become the de facto logo used across the state for all tolled facilities. The trademark is owned by the Transportation Corridor Agencies (TCA). There is some question whether it is the proper or applicable symbol to associate with express lanes, especially as Title 21 is being revisited.

4. CONSENSUS VISION



The previous section described the challenges of the HOV/express lane system today. This section presents the consensus vision that serves as the foundation for this Business Plan as a guiding document for how the HOV/express lanes in California will look, operate, and be managed in the future. The vision reflects how the system stakeholders define the priorities, principles, roles and responsibilities, and performance monitoring that will shape the development of the system.

4.1 Vision Statement

4.1.1 *Future Vision*

Integrated, Actively-Managed HOV and Express Lanes Bypass Freeway Congestion

In the future, the transportation system is reliable, congestion is managed, and the choice of express service is greatly improved since governments at all levels work together to truly manage demand with effective monitoring and adjustments of carpool and express lane operations and design.

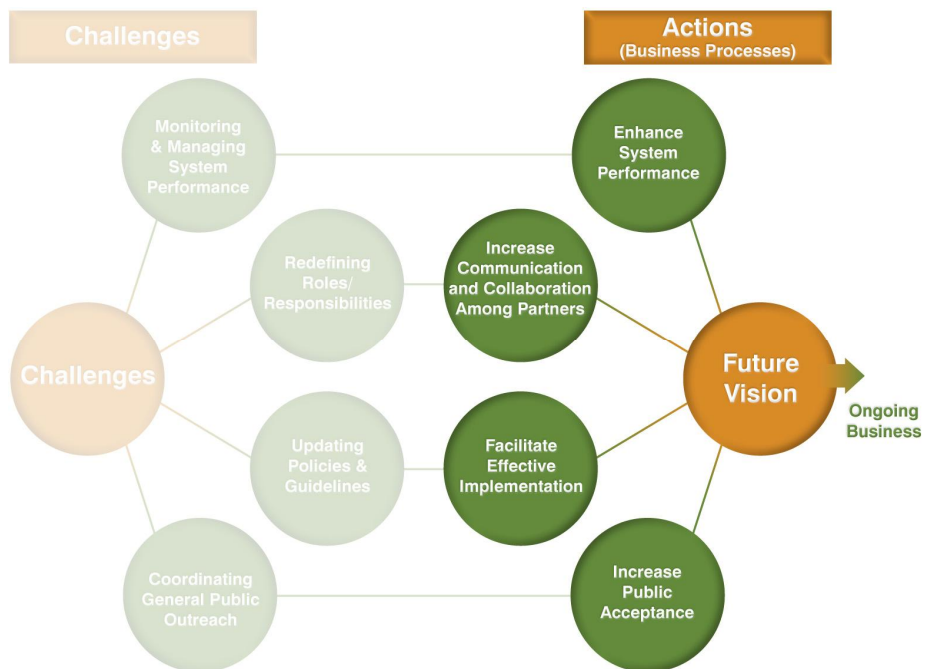
4.1.2 *How the System Looks and Operates in the Future*

- The HOV/express lane system offers effective choices for mobility. A motorist who chooses these facilities is confident that he or she will have a driving experience that is efficient, effective, reliable, and safe. By offering drivers this choice, the remaining congestion in the system is better managed.
- The HOV/express lane system provides for consistent facilities and connectivity for drivers' benefits. These lanes are recognizable in design and thus predictable for drivers in any area of California. The network is connected and seamless across and between regions.
- At the same time, it is understood that because no two roadways are exactly alike, it is necessary to carefully conform where possible to established policies, standards, and guidelines and consider changes where necessary to enable innovative project development and management by Caltrans and the regional transportation agencies. This allows for improvements and enhancements to be made as needs, methods, and technologies evolve.
- Management of the HOV/express lane system is based on clear performance measures. Consistent statewide procedures for data collection and performance reporting allow for the HOV/express lane system to be managed and operated efficiently.

5. OBJECTIVES AND CRITICAL ACTIONS



To restore the service levels, critical actions were defined to support an evolution of the HOV and express lane business to support more innovative congestion management strategies, including modified HOV operations and congestion pricing. These actions will provide for a managed approach that improves system performance and reliability, optimizes use of capacity, and creates new sources of revenue to further improve transportation in the corridor, including transit. The challenges and vision led to the development of four objectives and critical actions to accomplish the objectives. These are discussed below.



5.1 Objectives

Four objectives are noted below that address the specific, state-level challenges identified earlier in the report.

- **Enhance system performance** – improve the system monitoring and assessment and provide supportive tools to regional transportation agencies and Caltrans to make operational decisions and take action accordingly.
- **Increase communication and collaboration among partners** – increase communications and collaboration among the various agencies when planning, designing, operating, maintaining, or funding HOV and express lane facilities. Build on communication successes through enhancements to the organizational structure across the state.
- **Facilitate effective implementation** – implement HOV and express lanes effectively. Define policies that need to be updated or developed and overcome technical barriers in planning, design, and operations of HOV and express lane facilities.

- **Increase public acceptance** – increase public acceptance of HOV and express lanes. Provide a common voice and consistent message to the public as outreach and communications continue to be conducted by multiple stakeholders.

5.2 Critical Actions

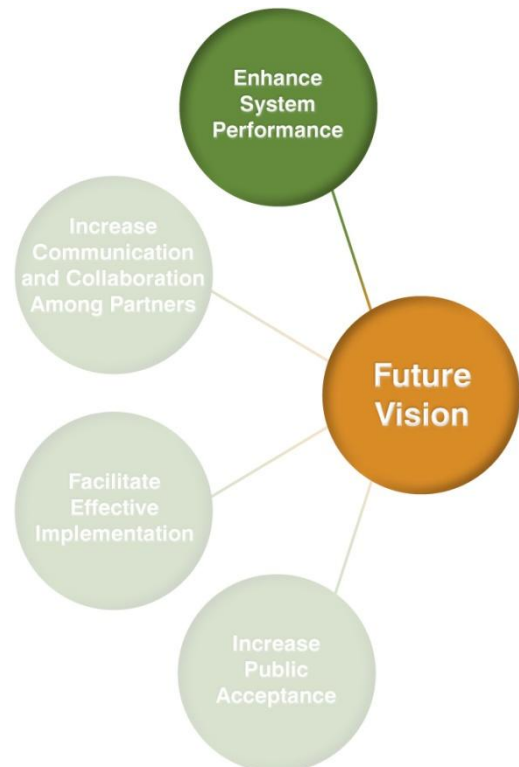
The objectives defined above contributed to the development of specific, critical action items required of involved agencies to evolve the statewide business to one capable of reaching the vision on a large scale. The actions are described below. Actions are proposed to be carried out by multiple stakeholders as noted, including Caltrans, regional transportation agencies, FHWA, and CHP. Partnerships between all stakeholders are essential. Continuation and expansion of existing partnerships, and perhaps the Advisory Committee established to guide this project, is proposed. Also, leveraging help from current committees such as the California Toll Operators Committee (CTOC), ITS America, and other national groups is recommended in implementing the following actions.

5.2.1 *Critical Actions to Enhance System Performance*

The current processes of data collection, monitoring, and reporting are addressed in this category alongside actions to improve the performance of the HOV and express lanes themselves. Guidelines for widespread and consistent data collection and reporting are proposed to be created. At a minimum, the guidelines should specify future performance monitoring and evaluation needs to satisfy the requirements set by FHWA, and they could be expanded in scope to monitor performance in a corridor-wide approach in line with state expectations on how HOV and express lanes operate within a wider, corridor-based context. Budget constraints (or ways of dedicating budgets) are considered as a part of this guidance.

Currently, the operating policies for most HOV lanes in the state rarely change once the minimum occupancy requirements and the hours of operations are established. The future vision involves regional transportation agencies and Caltrans having the ability to adjust operating policies over time to better respond to changing travel conditions and demand. Challenges to this more dynamic approach to operating HOV lanes are the lack of clear federal or state procedures to allow minimum occupancy and hours of operations changes, and the lack of sufficient performance data to understand and predict the impact of these types of changes.

The critical actions proposed for enhancing system performance are summarized below. Each action is numbered for future ease of reference.



- **A1: Collect and report consistent data.** More and better data is needed on the corridors that have HOV and express lanes; all highway lanes and adjacent/parallel arterials (where applicable) need to be monitored. PeMS data should be used wherever possible to minimize “manual” data collection. Other actions address the processes and performance metrics more specifically. In addition to system performance data, standards for new data types will be needed (such as user income levels, frequency of use, and average toll paid) to understand express lane operations. It is possible that such a user-data task could be coordinated by the CTOC. If CTOC is used as a basis for this dialogue, it should be noted that CTOC’s membership consists of agencies in California that are currently operating tolled facilities and as such, agencies that are in planning or design phases may not be fully represented without additional outreach efforts. **Responsible: Caltrans and regional transportation agencies**
- **A2: Establish common performance benchmarks and measures.** Performance measures and benchmarks can address the different compliance requirements and standards of performance from the federal, state, and regional transportation agencies. Inconsistencies between different requirements and standards of performance can be resolved through this cooperative action. **Responsible: Caltrans and regional transportation agencies**
- **A3: Improve data collection support and resources.** Given current budget challenges, agencies will have to work together to make the most of limited resources. Additionally, Caltrans and regional transportation agencies should partner to obtain the right levels of data collection funding for both HOV and express lane assessing and reporting. Regional transportation agencies are already collecting extensive express lane data. **Responsible: Caltrans and regional transportation agencies**
- **A4: Utilize better tools to collect, aggregate, and report corridor-wide data.** To provide detailed monitoring or performance, the PeMS system should be updated to collect, aggregate, and report corridor-wide data, including data for individual HOV and express lanes. This information is needed to assess the system performance and support decisions for operational changes, if needed. The CSMP and ICM tools and activities should be leveraged and integrated with the HOV/express lane planning activities as well. **Responsible: Caltrans**
- **A5: Assess active HOV lane management via pilot project(s) and ongoing monitoring.** Currently pilot projects are underway or imminent that will provide a more detailed understanding of the effects of adjusting minimum occupancy requirements, hours of operations, and striping details. Research will be conducted on these pilot projects. Information on whether the performance of individual HOV or express lanes or the whole corridor is significantly affected and whether bottlenecks could occur will be obtained from the results. Ongoing monitoring will continue to build on the understanding of the long-term effects of changing minimum occupancy requirements and time of day operations. **Responsible: Caltrans and regional transportation agencies**
- **A6: Establish regional and state guidelines for implementation of dynamic operations and clarify these guidelines with FHWA.** Guidelines and support for dynamic operations (including changing minimum occupancy, hours of operations,

conversion of existing lanes, or addition of new lanes) will be established at the regional and state levels and clarified with FHWA. The steps, approval process, approval criteria, and schedule to implement dynamic operations should be outlined.

Responsible: Caltrans, regional transportation agencies, and FHWA

- **A7: Expand the discussion of HOV/express lane strategies with transit interests.** Currently all express lane facilities in California have a transit component either as part of the customer base or as recipients of annual revenues. These opportunities to integrate and coordinate all modes of travel should continue to be sought. In some cases transit service is being directly increased and transit stops are being revised or redesigned to encourage a shift to transit and thus increase person throughput in the corridor. These examples should be assessed and lessons learned shared throughout the state. **Responsible: Caltrans and regional transportation agencies**
- **A8: Expand the assessment of the impacts of HOV/express lanes on goods movement and vice versa.** Goods movement is important to the economy of California and opportunities to coordinate strategies and continue to improve services should be encouraged. **Responsible: Caltrans and regional transportation agencies**

5.2.2 Critical Actions to Increase Communication and Collaboration Among Partners

Effective coordination and communication plays an important role in taking the stakeholders from where they currently are to where they envision the future. This is particularly important during the current time of rapidly changing political and technical landscape. The actions identified below provide more defined organization; assistance in defining roles, responsibilities, and relationships between the various agencies and partners; increased communication and interaction regarding HOV/express lane planning, design, construction, operations, and maintenance.

The critical actions for increasing communication and collaboration among partners include the following.

- **B1: Develop an ongoing coordinating committee and apply needed resources for HOV/express lane decisions and actions.** It is intended that this would be a group similar to the Advisory Committee for this project or an evolution of an existing committee. The mission of this group would be to implement actions in this Business Plan and to make decisions regarding actions and policies necessary to achieve the Vision. The group would provide input to studies on performance and technology,



outreach to promote benefits and educate the public, share operations and management lessons, and provide other discussion, dialogue and guidance as needed. When express lane projects are proposed, multiple agencies tend to be involved - this action could make this a more formal process with a broader perspective. Clear roles and responsibilities among all partner agencies should be established including identification of leadership roles within topical areas. It will be necessary for involved agencies to allocate resources both to the Committee membership and to carrying out the needed actions. **Responsible: All involved agencies**

- **B2: Establish staff resources and reserve funding for enforcement.** The terms of reimbursable services agreements between regional transportation agencies and CHP should be disseminated to other agencies developing express lanes. This information should then be used to help determine appropriate budgetary levels (staff and dollars) for enforcement by associated parties for system expansion. Sufficient staff (CHP and regional transportation agencies) resources and funding should be allocated for enforcement of the current and future system. **Responsible: CHP and regional transportation agencies**
- **B3: Address roles and responsibilities for violation enforcement.** Violations fall into the following primary categories.
 - Occupancy requirements and vehicle type – minimum number of passengers required for to qualify for HOV status, vehicle types allowed in the lanes, and vehicles that are exempt from the minimum occupancy requirement.
 - Toll evasion – vehicles do not have valid transponders or accounts.
 - Safety – violations of speed limits, access, and other safety violations.

Existing agreements between regional transportation agencies and the CHP should be reviewed and refined if necessary to clarify the discrete roles of each party (toll violations by agencies; access, safety, and occupancy by the CHP). **Responsible: Regional transportation agencies and CHP**

- **B4: Share lessons learned on financing options and operations and maintenance cost expectations.** Lessons learned on financing options and public-private partnerships should be shared with the partner agencies to minimize pitfalls. While non-compete clauses are problematic, negotiated compensation clauses (contract language between a private entity and the public owner that allows the public agency to make improvements in the same corridor as the tolled lanes but requires payment of a compensation fee to the private entity) could encourage continuing private investment. Details regarding capital, operations, and maintenance costs experienced on existing facilities would be helpful to share with other regional transportation agencies who are considering, planning, or designing these facilities in order to set expectations. Finally, potential cost economies in procurement and construction can be considered. **Responsible: Regional transportation agencies**

5.2.3 *Critical Actions to Facilitate Effective Implementation*

Currently, the HOV/express lane network is expanding primarily through new HOV lane miles, and express lane miles will soon expand exponentially. Project schedules have been largely driven by the need to obtain legislative and tolling authority. Regional transportation agencies across the state are taking different approaches towards express lane implementation. This strategy promotes a patchwork, rather than a network, of express lanes across the state.

The critical actions for implementation of express lanes are summarized in the following paragraphs.

- **CI: Update Caltrans' High-Occupancy Vehicle Guidelines.** The 2003 Edition of this Caltrans document provides ample advisory guidelines for HOV lane implementation and is focused on physical options that supplement details in the Highway Design Manual and the MUTCD 2003 California Supplement, and other such documents. The updated edition, now being initiated by Caltrans, is needed now to provide consistent guidance to existing and prospective project sponsors. It needs to incorporate lessons learned on recently completed or ongoing HOV and express lane projects. For example, guidelines for dual lane facilities and for entry and exit movements under different channelization or buffer cases can be enhanced by considering actual experience gained in implementing facilities on I-10 and I-110, among others. Also, knowledge gained from reversible HOV or express lane projects can be useful in defining guidance for these facility types. The same goes for guidelines for monitoring and enforcing express lane facilities, where experience gained on the 91 Express Lanes and I-15 Express Lanes, as well as implementation activities of the I-680 Express Lane project, would help to refine the Guidelines. Finally, it is known that extension of the northbound HOV lane on I-880 in Alameda County is not possible without right-of-way acquisition and exceptions to design standards for shoulders (among others possible). In this case, experience gained by Caltrans and others in implementing other HOV lane projects should be considered in the update. Put simply, Caltrans has standards that apply to all of its facilities statewide. An update to the noted Guidelines, completed in a participatory manner with all affected parties, will go a long way to complement established standards and help expedite planning and design of HOV and express lane facilities. **Responsible: Caltrans and regional transportation agencies**





- **C2: Support enabling legislation for more widespread tolling authority.** Legislation for express lane tolling, now written on a project-by-project basis, should be considered to provide blanket, statewide authority for tolling, financing, and franchising/operating agreements. There are currently bills being considered in the legislature that would contribute to this action. **Responsible: Regional transportation agencies**
- **C3: A statewide policy for exempt or discount vehicles should be considered.** The development of a statewide policy to allow toll exemptions or discounts for transit vehicles, currently stickered ILEV/hybrid vehicles, and current/future “green” vehicles should be considered. While managing congestion can reduce greenhouse gas emissions and should be a prime objective, policies and laws to further encourage green vehicles is understandably a continuing reality. This policy should have the consensus of regional transportation agencies in order to ensure that the policy, while addressing federal requirements, does not limit the ability of regional transportation agencies to sell revenue bonds or otherwise meet their related business obligations. **Responsible: All involved agencies**
- **C4: Revise or replace Title 21.** Title 21 needs to be revised or replaced to allow for updated communications, increased marketplace competition, and coordination with other modes and programs throughout the state. **Responsible: All involved agencies**
- **C5: Research automated enforcement technology and implement as available.** Current technology has not been proven to detect the occupancy of vehicles in a reliable manner. Technology should be researched to reduce manual enforcement efforts and implemented as desired by regional transportation agencies in cooperation with CHP if and when the technology reliability is demonstrated. SANDAG is currently conducting an evaluation of technologies for this purpose that may provide insights to this topic in the near future. Due to the high violation rate expected, Caltrans policy does not allow conversion of a limited-access facility to a continuous access express lane facility and seriously discourages continuous access on new express lanes until automated occupancy enforcement technology is available. **Responsible: CHP, Caltrans and regional transportation agencies**

5.2.4 *Critical Actions to Increase Public Acceptance*

Building on the positive examples in San Diego County, Orange County, and nationally, increased and sustained public and government-official acceptance is seen as critical to the success of the expanding HOV/express lane system. Gaining and keeping support and acceptance for express lanes especially requires considerable public outreach to understand existing public opinions and to emphasize benefits to different stakeholders in the form of time savings, expansion of driver choices, corridor-wide performance improvements to both mixed-flow and HOV/express lanes, and enhanced transit service. The following actions provide a framework to guide the many agencies in the state who are conducting this outreach to do so with a common voice.



- **D1: Educate the public on benefits of HOV and express lanes in a common way.** The advantages of utilizing dynamic operations on HOV lanes and of implementing express lanes must be communicated to the general public in a common way. Especially as dozens of express lanes are pursued in the short-term, having a common voice and message when multiple agencies are communicating with the public will be helpful to maintain the positive perceptions surrounding current express lanes (91 Express Lanes, I-15 Express Lanes) and building additional support around those coming on line. The outreach would also address the effects and benefits of changing the minimum occupancy requirements on an HOV lane. **Responsible: Caltrans to develop material; all involved agencies to communicate with the public and utilize materials as desired**
- **D2: Provide supporting data/education that addresses the negative connotations and perceptions.** Negative perceptions, such as social inequality and others where they exist, must be addressed by presenting data or research showing that users of express lanes reflect all income levels. Supporting data that improves the performance of the entire corridor or adjacent mixed-flow lanes (with changes in dynamic operations) can be used to educate the public. Caltrans can develop this material to support the use of a common voice and message in public communications across the state. The material would be available for use by regional transportation agencies and Caltrans as desired. There is also a need to gage the current public perception regularly in order to address actual perception, rather than a potentially-skewed media perception. **Responsible: Caltrans to develop material; all involved agencies to communicate with the public and utilize materials as desired**

- **D3: Provide a common symbol for use in recognizing the express lanes.** To distinguish express lanes from other facilities, a standard symbol to be used on signage and/or as lane markings should be created in conformance with Caltrans design standards. This provides for a network that is consistently recognizable for users across the state. The FasTrak® logo that is currently used should be considered in terms of its long-term applicability to the express lane network if it is to be used. **Responsible: All involved agencies**

5.3 Critical Action Implementation Schedule

California has already hit the ground running with several ongoing initiatives that are addressed within the list of identified critical actions to support the implementation of this Business Plan. Partners should continue to make progress and build upon these substantial efforts and consider the topics addressed in this Business Plan in doing so. The following are the critical actions from the list in **Section 5.2** that are already ongoing in California.

- **A4: Utilize better tools to collect, aggregate, and report corridor-wide data.** PeMS is already being evaluated for areas of improvement related to HOV and express lane reporting.
- **A5: Assess active HOV lane management via pilot project(s) and ongoing monitoring.** There are currently projects that are attempting changes to minimum occupancy requirements, changes to HOV access from limited to continuous.
- **B1: Develop an ongoing coordinating committee and apply needed resources for HOV/express lane decisions and actions.** There are currently many existing partnerships and committees that collaborate on projects across the state. This action proposes to formalize and to continue these efforts.
- **B4: Share lessons learned on financing options and operations and maintenance cost expectations.** Especially as it relates to express lanes, OCTA and SANDAG have been monumental in providing supportive data and input to partner agencies as they define their own express lane projects.
- **C2: Support enabling legislation for more widespread tolling authority.** There are current activities that would provide for blanket tolling authority, reducing the overall effort in the state to gain tolling authority on a project-by-project basis.
- **C5: Research automated enforcement technology and implement as available.** SANDAG is currently conducting an evaluation of technologies for this purpose that may provide insights to this topic in the near future.
- **D1: Educate the public on benefits of HOV and express lanes in a common way.** Many efforts are currently underway to communicate with the public for current and upcoming projects – these efforts will continue and should consider doing so in a coordinated manner.

To build on the groundwork for further development of the HOV/express lane system, the following critical actions are new processes (from the list in **Section 5.2**) that are ready to be started immediately.

- **A1: Collect and report consistent data.**

- *A3: Improve data collection support and resources.*
- *C1: Update Caltrans' High-Occupancy Vehicle Guidelines.*
- *C4: Revise or replace Title 21.*

The remainder of the actions described previously in **Section 5.2** may require input from the immediate actions described above, or for some of the immediate actions to begin before proceeding. All of them, though, are still important to progressing along the path laid in this Business Plan, and as such, they all are depicted as being completed within an aggressive 3-year schedule and shown in **Figure 6**.

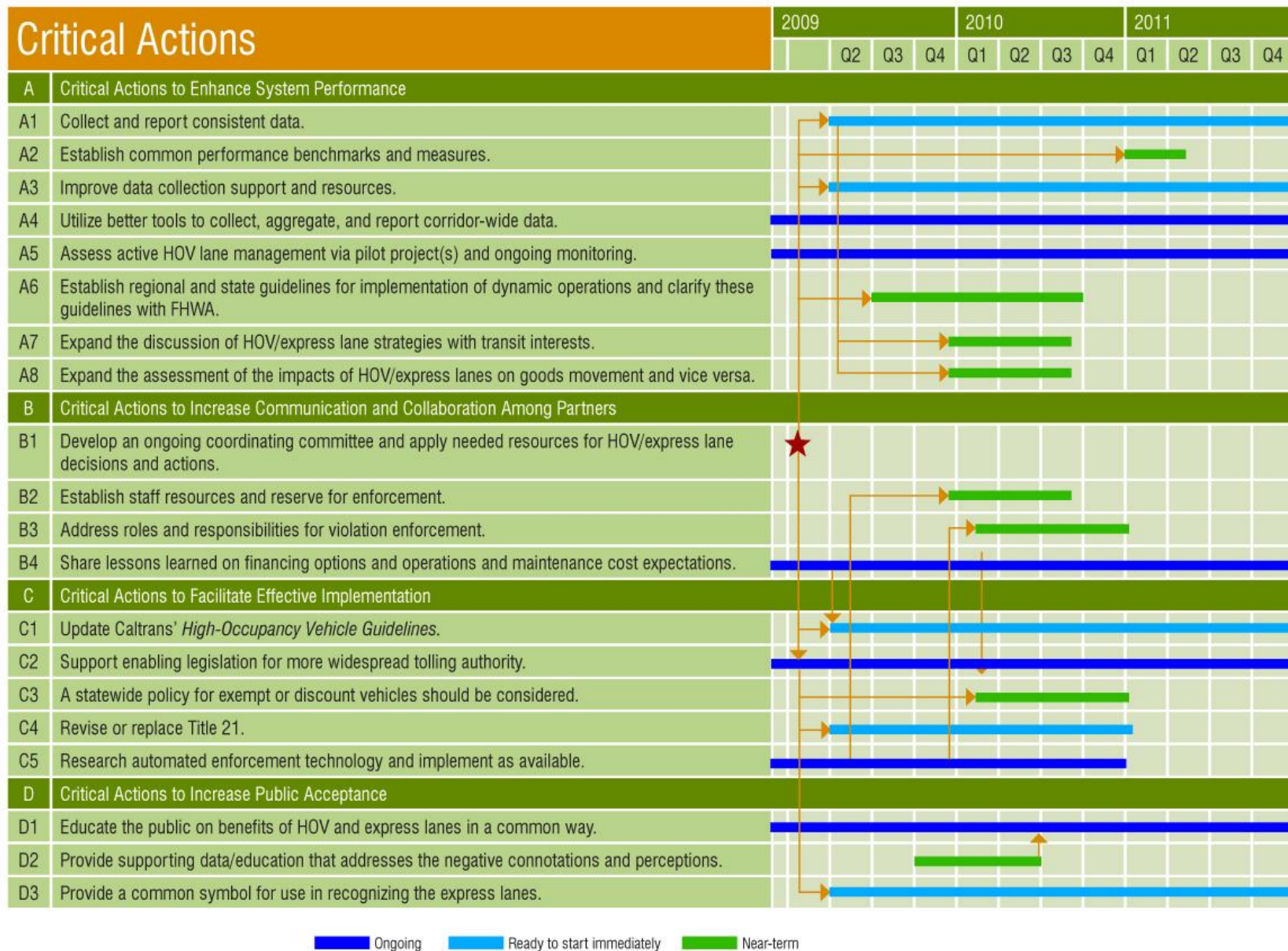


Figure 8 – Critical Action Plan Implementation Schedule

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